



A STUDY ON BODY WEIGHT LOSS IN RATS BY THE LEAVES OF *ABRUS PRECATORIUS* LINNAEUS: EFFECT OF SEASON

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ABSTRACT

Body weight loss in albino rats by the leaves of *Abrus precatorius* Linnaeus was studied. It was observed that leaves of *A. precatorius* L. could induce weight loss in rats. Weight loss started right from 10th day but significant loss was observed from 20th day onwards. Effect of seasons on body weight loss in rats by the leaves of *A. precatorius* L. was also studied. Results showed that leaves of *A. precatorius* L. during the months of July and August could induce maximum body weight loss in rats.

Key Words:- *Abrus precatorius* L., Albino rats, Body weight loss, Seasonal variation.

INTRODUCTION

Abrus precatorius Linnaeus has been used in Hindu medicines from very early times, as well as in china and other ancient cultures (Gurung Bejoy, 2002). The plant was considered beneficial for the hair and the seeds extract is used in the treatment of ulcer and skin affection (Chopra *et al.*, 1958). Seeds of the plant are very much attractive, used in ornaments, but are highly poisonous. Seeds are reported to have anti diabetic property (Monago CC *et al.*, 2005) may induce abortion (Noumi Emmanuel, 2007), have anti oxidative property (Pal Ranju S *et al.*, 2009) as well as anti-inflammatory analgesic activity (Arora Rashmi *et al.*, 2011).

Saganuwan and Gulumbe (Saganuwan SA *et al.*, 2007) reported antimicrobial activity of the aqueous extract of *Abrus precatorius* Linn. against *Salmonella typhimurium*, *Escherichia coli*, *Klebsiella pneumoniae*, *Streptococcus pyogenes* and *Streptococcus pneumoniae*. Karamoko *et al.* also showed antibacterial activities of the

aqueous extract of the plant. Other uses of the plant are observed in cancer and in malaria (Saganuwan SA, 2011). Phytochemical components of the plant are abricin, abrin, abrisin, abrine, abraline, abrasine, abrusgenic acid-methylester, abruslectone, abruscic acid, anthocyanins etc. (Kishor S Chaudhari *et al.*, 2012; Ghosh MN, 2005).

In a pilot experiment we have seen that leaves of *A. precatorius* L. could exert body weight reduction in albino rats. We studied in detail to confirm the observation. In present communication we report results of experiments related to body weight loss in rats by the leaves of *A. precatorius* L. and effect of season on such activity of the plant leaves.

MATERIALS AND METHODS

Collection of plant material

Leaves of *Abrus precatorius* Linnaeus were collected in morning hours (9 – 10 AM) from the medicinal plants garden of the University of North Bengal, Dist. Darjeeling, west Bengal, India randomly and during the periods of January – February, March – April, May – June, July – August, September – October and November – December of the year 2012. Leaves were authenticated

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by the experts of the department of Botany of the said University. A voucher specimen was kept in the department of Medical Biotechnology, Sikkim Manipal Institute of Medical Sciences of Sikkim Manipal University, Gangtok, Sikkim, India for future references.

Preparation of test drug from the leaves

Leaves of *Abrus precatorius* Linn. were shed dried and powdered. The powder was used as test drug.

Acute oral toxicity study

Acute toxicity studies were carried out on Swiss albino mice by the method of Ghosh (Ghosh MN, 2005). Test drug developed from the leaves of *Abrus precatorius* Linnaeus was given at doses of 100, 200, 500, 1000 and 3000 mg/kg to different groups of mice each group containing six animals. Watery suspension of the test drug was given to the animals orally through a feeding tube. After administering the test drug, the animals were observed for the first three hours for any toxic symptoms followed by observation at regular intervals for 24 hours up to seven days. At the end of the study, the animals were also observed for general organ toxicity, morphological behavior and mortality.

Animals

Male Wister strain rats, body weight between 35 and 40g, were used for this study. Animals were housed individually in polypropylene cages, maintained under standard conditions like 12h light and 12h dark cycle, 20 - 30 degree centigrade, 35 - 60 % humidity. Rats were fed with standard rat pellet diet (Hindustan Lever Ltd., Mumbai, India) and provided water *ad libitum*. The animal experiment was approved by the ethics committee of the Institute.

Experimental design

In first set of experiment, rats were divided into two groups of eight each. First group of animals took normal diet while animals of the second group, in addition to normal diet, took test drug prepared from randomly collected leaves of *Abrus precatorius* Linnaeus in the dose of 1g/kg body weight daily. Test drug in the form of suspension in water was administered to the rats orally through a feeding tube. Dose selection of the test drug was as per of our earlier studies (Mitra P and Mitra PK, 2008; Mitra Prasanta Kumar, 2014). Experiment was continued for 40 days.

In second set of experiment rats were divided into following groups of eight each.

Control: In this group normal diet and water were given to rats.

***A. precatorius* L. (January – February):** Powder from leaves of *A. precatorius* L. of the periods January – February was given to the rats daily through oral route along with normal diet and water. Dose was 1g/kg body weight of the animals.

***A. precatorius* L. (March – April):** Powder from leaves of *A. precatorius* L. of the periods of March – April was given to the rats. Rest part was same to that of group – 2.

***A. precatorius* L. (May – June):** Powder from leaves of *A. precatorius* L. of the periods May – June was given to the rats. Rest part was same to that of group – 2.

***A. precatorius* L. (July – August):** Powder from leaves of *A. precatorius* L. of the periods July – August was given to the rats. Rest part was same to that of group – 2.

***A. precatorius* L. (September – October):** Powder from leaves of *A. precatorius* L. of the periods September – October was given to the rats. Rest part was same to that of group – 2.

***A. precatorius* L. (November – December):** Powder from leaves *A. precatorius* L. of the periods November – December was given to the rats. Rest part was same to that of group – 2.

Experiment was continued for forty days.

(In all cases leave powder was given in the form of watery suspension).

Growth of rats

Growth of rats was measured on 10th, 20th, 30th and 40th day. Overall behavior of the animals was noted.

Statistical analysis

The values were expressed as mean \pm SEM and were analyzed using one-way analyses of variance (ANOVA) using Statistical Package for Social Sciences (SPSS). Differences between means were tested employing Duncan's multiple comparison test and significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

Acute toxicity studies

Acute toxicity studies revealed that the test drugs (powder of leaves of *A. precatorius* L.) did not produce any toxic symptoms when administered orally to mice in doses of 100, 200, 500, 1000 and 3000 mg/kg. Animals were healthy, cheerful and behaved normal throughout the experimental period. No death of animal was recorded during seven days of experiment.

Table – 1 shows effect of powdered leaves of *A. precatorius* L. (randomly collected) on body weight of rats. It appears from the table that leaves of *A. precatorius* L. could decrease body weight of rats. For first ten days the decrease was not statistically significant but after that

up to 40 days there was significant decrease ($p < 0.001$) in body weight in those rats who took powdered leaves of *A. precatorius* L. in addition with normal diet. The animals also developed anorexia.

Results relating to the seasonal variations in growth inhibition of rats by powdered leaves of *A. precatorius* L. was given in Table – 2. Results showed that maximum inhibition in growth of rats by the leaves of *A. precatorius* L. was found during the period July to August. Results were statistically significant up to the level of $p < 0.001$. Leaves of *C. alata* L. (for the months of September – October and November - December) could also decrease body weight of the rats but the magnitude was less than that of the leaves of *A. precatorius* L. for the months of July and August. Leaves of *A. precatorius* L. for the months of January – February, March - April and May – June however, did not show any effect on growth inhibition in rats. Effect of leaves of *A. precatorius* L. of

different seasons on body weight of rats on 40th day of experiment was shown in Figure – 3.

Fluck and Pharm (Fluck H and M Pharm, 1955; Arambewela LSR and Ratnayake CK, 1988) showed influence of climate on the active principles in medicinal plants. Thereafter, series of experiments were conducted in this direction. Now days numerous reports are available in literature which suggest that accumulation of chemical compounds in roots, stem and leaves of plants varies with season (Feeny P, 1970; Gupta PL, 1977; Mauffette Y and Oechel WC, 1989; Schultz JC et al., 1982).

Maximum growth inhibition of the rats by the leaves of *A. precatorius* L. during the period of July to August is probably due to accumulation of chemical compound(s) in the leaves responsible for body weight reduction. We are now engaged to work of isolation and characterization of the chemical compound(s).

Table 1. Effect of powdered leaves of *Abrus precatorius* Linnaeus (randomly collected) on growth of rats (Changes of body weight in gram)

Group	Treatment	10 th day	20 th day	30 th day	40 th day
1	Normal	39.1 ± 1.3	50.3 ± 1.5	60.2 ± 1.9	71.1 ± 2.0
2	<i>A. precatorius</i> L. leaves	37.0 ± 1.0	43.1 ± 1.5*	41.4 ± 1.5**	39.1 ± 1.1**

* $p < 0.001$, *A. precatorius* L. : 1 g / kg, . * $p < 0.05$, ** $p < 0.001$.

Table 2. Seasonal variations in anti growth property of powdered leaves of *Abrus precatorius* Linnaeus (Changes of body weight in gram)

Treatment	10 th day	20 th day	30 th day	40 th day
Normal	40.2 ± 1.3	59.8 ± 1.7	62.5 ± 1.8	65.2 ± 2.0
<i>A. precatorius</i> L. (Jan-Feb)	39.0 ± 1.1	56.4 ± 1.5	58.3 ± 1.1	60.1 ± 2.3
<i>A. precatorius</i> L.(March – April)	40.2 ± 1.1	58.0 ± 1.7	60.2 ± 1.5	62.4 ± 2.0
<i>A. precatorius</i> L.(May – June)	38.5 ± 1.2	56.2 ± 1.4	54.0 ± 1.6	53.1 ± 2.2*
<i>A. precatorius</i> L.(July – August)	36.4 ± 1.3	49.1 ± 1.9*	45.1 ± 1.6**	40.2 ± 1.3**
<i>A. precatorius</i> L.(Sept. – Oct.)	37.2 ± 1.5	57.2 ± 1.5	56.9 ± 1.5	54.2 ± 1.1*
<i>A. precatorius</i> L.(Nov. – Dec.)	38.6 ± 1.6	58.9 ± 1.3	60.8 ± 1.9	61.9 ± 1.7

* $p < 0.001$, *A. precatorius* L. : 1 g / kg, . * $p < 0.05$, ** $p < 0.001$.

Fig 1. *Abrus precatorius* Linnaeus.



Fig 2. Effect of powdered leaves of *Abrus precatorius* Linnaeus (randomly collected) on growth of rats (Changes of body weight in gram)

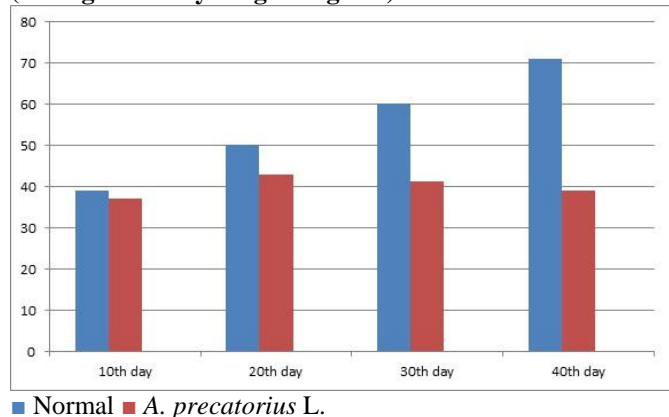
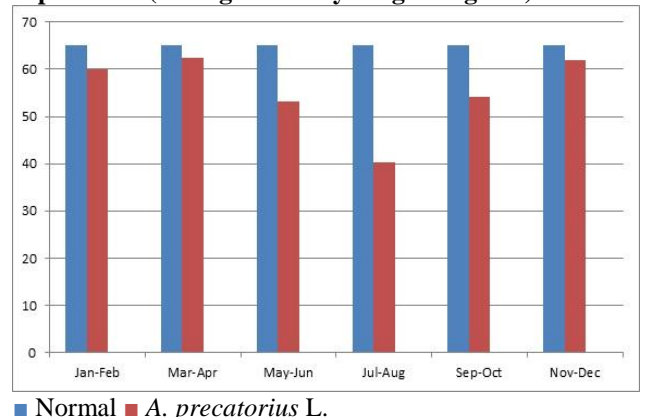


Fig 3. Effect of leaves of *Abrus precatorius* Linnaeus of different seasons on body weight of rats on 40th day of experiment (Changes of body weight in gram)



CONCLUSION

The present study showed that leaves of *A. precatorius* L. could inhibit growth of rats. Growth was in

terms of body weight. Maximum inhibition was noted with the leaves of *A. precatorius* L. during the period July to August.

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